

WHAT IS CLAIMED IS:

1. A method comprising:
selecting a protective area of a substrate;
5 providing a first surface roughness over a first area of a substrate; and
providing a second surface roughness over the selected protective
area of the substrate, the second surface roughness being different than the first
surface roughness.

10 2. The method of claim 1, wherein selecting the protective area
comprises determining an area in which to prevent overflow of underfill material.

15 3. The method of claim 1, wherein providing the first surface roughness
and providing the second surface roughness comprises performing a sputtering
process over the surface of the substrate using a mask.

4. The method of claim 3, wherein the sputtering process provides less
sputtering to the protective area than the first area.

20 5. The method of claim 3, wherein the sputtering process comprises an
oxygen plasma sputtering process.

6. The method of claim 3, wherein the sputtering process comprises a hydrogen plasma sputtering process.

5 7. The method of claim 1, wherein providing the first surface roughness and providing the second surface roughness comprises performing a chemical etching over the substrate.

8. The method of claim 1, further comprising providing an underfill material over the first area of the substrate.

10 9. The method of claim 1, wherein the protective area is selected to avoid underfill overflow into a particular area of the chip.

15 10. The method of claim 1, further comprising attaching a die over the first area of the substrate.

11. The method of claim 10, further comprising providing underfill material between the die and the substrate without overflowing the underfill material over all of the protective area.

20 12. The method of claim 1, wherein the substrate includes a solder resist.

13. A method comprising:

obtaining a substrate;

identifying a die placement area and a keep out area of the substrate;

forming a protective area over the substrate between the die
5 placement area and the keep out area; and

flowing an underfill material over at least the die placement area of the
substrate and preventing the underfill material from flowing over the protective area
based on surface roughness.

10 14. The method of claim 13, wherein forming the protective area
comprises:

providing a first surface roughness over the die placement area of a
substrate; and

providing a second surface roughness over the protective area of the
15 substrate, the second surface roughness being different than the first surface
roughness.

15. The method of claim 14, wherein providing the first surface roughness
and providing the second surface roughness comprises performing a sputtering
20 process over the surface of the substrate using a mask.

16. The method of claim 15, wherein the sputtering process provides less
sputtering to the protective area than the die placement area.

17. The method of claim 15, wherein the sputtering process comprises an oxygen plasma sputtering process.

18. The method of claim 15, wherein the sputtering process comprises a hydrogen plasma sputtering process.

19. The method of claim 14, wherein providing the first surface roughness and providing the second surface roughness comprises performing a chemical etching over the substrate.

20. The method of claim 13, further comprising attaching a die over the die placement area of the substrate.

21. The method of claim 20, wherein flowing the underfill material comprises flowing the underfill material between the die and the die placement area of the substrate.

22. The method of claim 13, wherein the underfill material flows in the die placement area without flowing to the keep out area based on the surface roughness of the die placement area and the surface roughness of the protective area.

23. The method of claim 13, wherein the protective area is selected to avoid underfill overflow into the keep out area of the substrate.

24. The method of claim 13, wherein the substrate includes a solder resist.

25. An apparatus comprising:

a substrate having a die placement area and a keep out area, the
substrate having a first surface roughness over the die placement area and a
second roughness over a protective area between the die placement area and the
keep out area.

26. The apparatus of claim 25, wherein the second roughness is selected
to prevent overflow of underfill to the keep out area.

27. The apparatus of claim 25, further comprising a die attached over the
die placement area.

28. The apparatus of claim 25, further comprising underfill material
provided between the die and the substrate in the die placement area without the
overfill material provided within the keep out area.

29. The apparatus of claim 25, wherein the substrate comprises a printed
circuit board.

30. The apparatus of claim 25, further comprising a passive electrical
element provided in the keep out area.